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A NEW OCCURRENCE OF PTILOLITE[1]

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THE mineral described in this paper was submitted to the U. S. National Museum for examination and report; it was stated to come from Challis, Idaho. It was examined optically by Dr. Wherry and found to agree in properties with the rare species ptilolite; this was confirmed by Mr. E. S. Larsen, of the U. S. Geological Survey. This mineral having heretofore been known only in minute amount, from three places in Colorado, whereas the present specimen shows a mass of it 10 x 7 x 4 cm. (4 x 3 x 1½ inches) and is from an entirely new region, makes the occurrence worth special description.

The matrix, of which a small amount is attached to one side, is a highly weathered basic igneous rock. The rock is coated with a 1 cm. layer of chalcedonic silica, on which the ptilolite rests. The latter is a soft fluffy mass of minute fibers resembling fine asbestos or glass-wool.

To further confirm the identity of the mineral, a sample was submitted to analysis, but the first constituent determined, SiO_2, yielded an almost incredibly high figure, considering that a silciate was represented, namely 81.5%. It seemed as if some silica must be present as an impurity, altho the sample had been picked with care from what seemed to be pure material. On microscopic examination there were found to be numerous minute spindle-shaped grains of quartz, really doubly terminated crystals with rounded edges, scattered thru the mass of ptilolite, and enclosing many needles of the latter. The importance of thoro microscopic study of all minerals to be analyzed is thus once more exemplified.

[1] This work was done while the writer was private assistant to Dr. George P. Merrill, of the U. S. National Museum, and is published by permission of the Secretary of the Smithsonian Institution.

To supplement the description of ptilolite given in Dana's System, page 572, the optical properties and specific gravity, determined on this specimen by Messrs. Larsen and Wherry, are here recorded:

Specific gravity, determined by suspension of minute, quartz-free fibers in a heavy solution, 2.30 ± 0.01.

Under the microscope seen to consist of well-defined, transparent needles; refractive indices: $\alpha = 1.475$, $\beta = 1.477$, $\gamma = 1.478$, all ± 0.003. Biaxial with large axial angle, and optically negative; extinction parallel and elongation negative.

It was found to be impossible to free the sample from quartz by the use of heavy solutions, so only a partial analysis was made; the results are presented in table 1.

TABLE 1

	1	2	3
SiO_2	81.5	72.3	70.4
Al_2O_3	8.2	12.3	11.9
CaO	1.7	2.6	3.9
MgO	0.3	0.4	—
K_2O	1.0	1.5	2.8
Na_2O			0.8
H_2O	7.3	10.9	10.2
Totals	100.0	100.0	100.0

1. Analysis by L. H. K.; alkalies obtained by difference.
2. Same after deducting 33⅓% of quartz and recalculating to 100%.
3. Analysis of ptilolite, from Dana, for comparison.

These results indicate the material to be undoubtedly ptilolite.

DIASPORITE IN MISSOURI. Edgar T. Wherry. Washington, D. C.

During the past year about twenty-five samples of minerals have been received for identification by the editors of this magazine. Among the rarer minerals represented there may be mentioned fuchsite, uraninite, margarite, vesuvianite, and diaspore or diasporite; the latter form of this name is preferred by the writer for the sake of uniformity. Diasporite is usually represented in collections by crystalline coatings associated with corundum; but the material submitted consists of gray sandy grains imbedded in white clay. Its identity was established, first, by optical examination, it proving to be biaxial, with two refractive indices = 1.70 and 1.75; and this was confirmed by chemical tests: it is insoluble in acids but after fusion with sodium carbonate dissolves and yields reactions for aluminium with only traces of other elements.

The locality for this unusual occurrence is stated to be Rosebud, Missouri, about 85 miles west of St. Louis. It is reported to form lenses in clay, known locally as "sand-rock" or "ashy clay," of many hundreds of tons in weight; it must therefore be the largest deposit of diasporite thus far discovered. The clay is presumably residual, left behind upon the weathering away of limestone strata, and the diasporite has probably been developed by the action of hydrothermal waters on the clay. The region should certainly be investigated by a mineralogist to ascertain whether showy crystalline specimens occur there also.

GEL MINERALS (COLLOID MINERALS)

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(*Continued from page 138*)

It is the belief of the writer that considerable confusion has arisen over the significance of the property of taking up dyes. When a mineral is in a hydrogel condition it is capable of adsorbing foreign matter but, upon drying out, this property is lost to a greater or less extent. Dittler pointed out, further, that the rate of decolorization of a dye solution seems to be dependent on the water content of the mineral powder. Also, that the acid and basic character of the mineral is a considerable factor,—the more acid a gel the more quickly it seems to adsorb a dye. From the experiments performed by the writer, he has been led to believe that the power of taking up dyes may be due in large part to capillarity, induced by structures such as granularity, strain cracks, drying cracks, cleavage and porosity, which may occur in crystalline minerals as well as in gels.

The conclusion to be drawn, then, is that the adsorptive properties of minerals are not reliable for the determination of their gel character.

The method of attack was as follows: The preliminary treatment was like that employed in "The Determination of Minerals of Non-Metallic Luster."[14] The mineral was crushed (not ground) to pass a 100-mesh screen and be retained on 120-mesh. The crushed material, carefully sized, was then treated with dye solutions of different strengths and at different temperatures. After filtration and washing the fragments were examined under the microscope. It was found that classification on this basis was not at all satisfactory. For example, samples of the same substance from different localities gave in the majority of cases widely different results. This was due to the difference in content of water, structures, etc.

The same objections apply to the use of highly colored mineral salts, such as potassium dichromate and copper sulfate. The mineral was boiled with a solution of potassium dichromate, filtered and washed, and a dilute solution of silver nitrate added to the fragments on a slide glass; in some cases the reddish-brown

[14] *School Mines Quart.*, **34** (4), 1913.

precipitate stained the fragments thruout. This method seemed to be the most practical and is to be recommended for the determination of gel minerals where the adsorptive property is used. It, however, has limitations and allowances must be made for capillarity, etc., in crystalline minerals.

Another method used was staining with copper sulfate. Here the fragments, after boiling, filtering and washing, were treated on a slide glass with dilute ammonia. The method has the disadvantage of there being an interchange of copper ion in some cases, especially with the aluminium silicate gels such as halloysite, allophanite, etc.

Another attempt with tincture of iodine was made. The procedure was to allow the mineral fragments to soak in a solution of iodine for half an hour. Upon removal, and after rinsing with water, dilute ammonia was added, on a slide glass. The ammonia decolorized the iodine too rapidly for any useful result to be obtained from this method.

After apparent failure with dyestuffs, another method of attack was investigated. The possibility of obtaining colloidal solutions by simply boiling a gel mineral in water and filtering thru the best grade of filter paper obtainable, was the principle underlying the procedure. The mineral, finely powdered, was boiled in water for half an hour. After filtering through five filters, careful precautions being taken to avoid the entrance of dust, the filtrate was observed by means of the apparatus described under Tyndall ray phenomena (see first instalment).

Powdered opal gave an opalescent solution which showed a marked Tyndall cone. Psilomelanite and wad similarly treated gave a less marked Tyndall effect. However, if larger particles of opal, free from powder, were treated in the same manner, no opalescent solution was obtained, and the Tyndall light cone diminished greatly. Calcite, carefully sized between 100 and 120 mesh, and treated in the same manner, also gave a positive Tyndall effect. Finely powdered quartz (crystallized) gave the same results.

The conclusion to be drawn from this is that the effect produced is merely the result of fine grinding, of disintegration due to boiling, or of a combination of both. No reliance can be placed upon the method whereby simple solutions of the gel mineral in water are employed.

In experimenting with a few samples of clayey material the

writer obtained one which was fairly plastic and which removed the coloring matter from methylene-blue solution. After digesting with the dye the clayey matter was examined under the microscope and some flaky sericite particles it contained were seen to have taken up the dyestuff between fine cleavage plates. This would tend to cast some doubt upon the results Ashley[15] obtained for the determination of the plasticity in clays from their adsorptive power, regarded by him as due entirely to colloidal matter.

Bibliography.—An elaborate summary of the older literature of gel minerals has been compiled by Himmelbauer;[16] space will not permit its reproduction here. More recent articles are abstracted in *Chemical Abstracts* and in various mineralogical publications.

Conclusion.—The original object of this paper was to secure some method for the certain identification of minerals as gel minerals. However, few new facts of a positive nature have been obtained. This is due mainly to the fact that much more experimental data is necessary, and any conclusions which may be drawn from present results are merely tentative and subject to revision.

Acknowledgment.—Any merit which this paper may possess is due to the many kind suggestions of Professor A. J. Moses, Professor C. P. Berkey and Mr. Harry F. Gardner.

PROCEEDINGS OF SOCIETIES

Philadelphia Mineralogical Society

The Wagner Free Institute of Science

The Philadelphia Mineralogical Society held its twenty-fifth anniversary meeting on October 11, 1917, with President Leffmann in the chair.

Messrs. Leffmann, Rothermel, Allen, M. Bernstein, Bradford, Egee, Flack, Gordon, Geist, Groth, Herwegh, Jones, Knabe, Koch, Munson, Oldach, Trudell, Warford, Wherry and eight visitors, were present.

Dr. Leffmann made a brief address on the modern development of mineralogy.

Dr. Wherry outlined how he had become acquainted with the P. M. S. and how he came to make his first contribution to mineralogy. He then described his new work in the Bureau of Chemistry, U. S. Dept. of Agriculture. A thoro study of the optical-crystallographic properties of materials entering into foods and drugs is contemplated, along similar lines to past work in mineralogy. Heretofore the possibilities of the petrographic microscope in the quick and accurate determination of chemical substances outside of minerals have been little appreciated.

[15] *Bull.* 388, U. S. Geol. Survey, 1909.

[16] *Fortschritte Mineralogie, etc.*, 3, 1913.

Mr. Howard Goodwin presented some reminiscences of past collecting experiences, touching on comic incidents of these excursions and peculiarities of certain participants.

A telegram from Dr. George F. Kunz, and a letter from Mr. John Eyerman congratulating the society on the twenty-five years' work were read.

Dr. Wherry announced the death of Prof. Amos P. Brown, one of the honorary members of the society.

A letter from Mr. Elmer Benge, past president and active member of the Society was read regretting his absence, and remarking that:

"A quarter century mark reached by an organization certainly shows a stability of purpose, worthiness of cause, steadfastness of interests by its officers, and a live necessity for its objects and work."

Col. Washington A. Roebling, nominated by Dr. Wherry, and Mr. Elmer Benge, nominated by Mr. Gordon, were elected to honorary membership.

The society then adjourned for a smoker and an exhibition of minerals by Messrs. Warford, Trudell, Gordon, and Geist.

SAMUEL G. GORDON, *Secretary.*

HISTORY OF THE PHILADELPHIA MINERALOGICAL SOCIETY

The Philadelphia Mineralogical Society was founded, as "The Students Mineralogical Club," by Henry Goodson Ives, James E. Richardson, and Henry Clay Borden, in October, 1892, at the house of Mr. Ives. Mr. Ives was elected chairman, and Mr. Richardson the first secretary. The purpose of the society was to provide a common meeting ground where young enthusiasts could meet to discuss minerals.

The first meetings were held bi-weekly at the homes of the various members, later ones at the Academy of Natural Sciences, and since 1905 the Wagner Free Institute of Science has been the regular meeting place.

The first paper was presented by Mr. Ives, on "Frankford Minerals"; and many of those that followed have been also on local mineralogy, with reports of field-work, of analyses, or of the determination of doubtful local species. Many important contributions to local mineralogy have been made, most of them having appeared in the "The Mineral Collector," which was the official organ of the Society until its discontinuance in 1909.

The Society has never formed a regular cabinet, its work in this line having been confined largely to adding to the local collections of the Wagner Institute and of the Academy of Natural Sciences. But two special collections have been made and donated, one of minerals exhibiting characteristic taste, smell, touch and form, to the Pennsylvania Blind Asylum; and the other of an extensive educational series of minerals, to the Northeast Manual Training High School.

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